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IS 7157 (1987): Portable Pneumatic Grinding Machines [PGD
8: Pneumatic Tools]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
PORTABLE PNEUMATIC GRINDING MACHINES

(First Revision)

1. Scope — Specifies the dimensions and requirements of portable pneumatic grinding machines suitable for working with abrasive wheels of nominal diameter up to 250 mm. It does not cover grinding machines for use with coated sanding discs.

2. Terminology

2.1 Free Air Consumption — Volume of air, corrected to standard atmospheric conditions of temperature and pressure, according to IS : 196 - 1966 'Atmospheric conditions for testing (revised)', consumed by the grinding machine.

2.2 Gauge Pressure — Steady pressure reading of the compressed air on the gauge which shall be located within three metres from the inlet of the grinding machine.

2.3 Grinding Machine — Machine designed to carry abrasive wheel, buff, wire brushes or other appliances for removing the metal by abrasive action of the rotating wheel.

2.4 Portable Grinding Machine — Grinding machine designed to be held, and operated while being held, in the operator's hands during its normal working.

2.4.1 Straight type portable grinding machine — Grinding machine with the spindle of the wheel in line with the handle and the grinding action done by the periphery of the wheel.

2.4.2 Right angle type portable grinding machine — Grinding machine with the spindle of the wheel at right angles to the handle and the grinding action done mainly by the face (side) of the wheel.

3. Types — The grinding machines shall be of the following two types:

Type A — Straight type, and

Type B — Right angle type.

4. Dimensional Requirements — Shall be as given in Table 1 read with Fig. 1.

5. Designation — A grinding machine of nominal size 125 and Type A, shall be designated as:

Portable Grinding Machine 125 A IS : 7157

6. General Requirements

6.1 Abrasive Wheel — For the selection of various types, sizes, grades and bonds of the abrasive wheels, reference be made to IS : 1249-1972 'Recommendations for selection of grinding wheels (first revision)', and for dimensions of the grinding wheels, to IS : 2324 (Part 2) - 1985 'Dimensions for bonded abrasives grinding wheels', IS : 8915-1978 'Dimensions for depressed centre wheels type 27', IS : 9291 - 1979 'Dimensions of internal grinding wheels' and IS : 3300 - 1980 'Dimensions for mounted points (second revision)'.

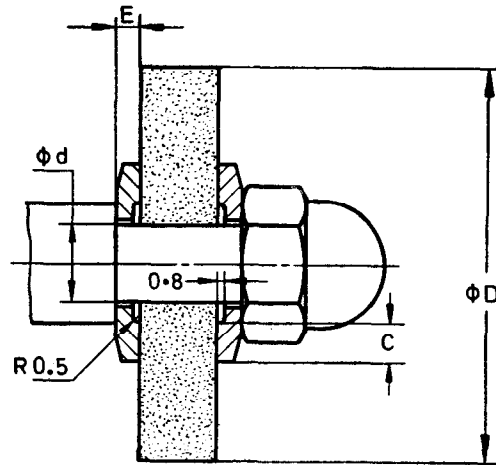
6.2 Wheel Speed — The peripheral wheel speeds, calculated on the largest wheel diameter; shall not exceed the safe limits given below and the relevant Indian Standards:

- | | |
|---|--|
| a) Mounted wheels | : According to IS : 1991 (Part 10) - 1987 'Safety code for the use, care and protection of abrasive wheels: Part 10 Mounted wheels (second revision)', |
| b) Vitrified bonded wheels | : 2 000 metres per minute, |
| c) Resinoid bonded wheels | : 3 000 metres per minute, and |
| d) Resinoid bonded depressed centre discs and reinforced flat cut of wheels | : 4 800 metres per minute. |

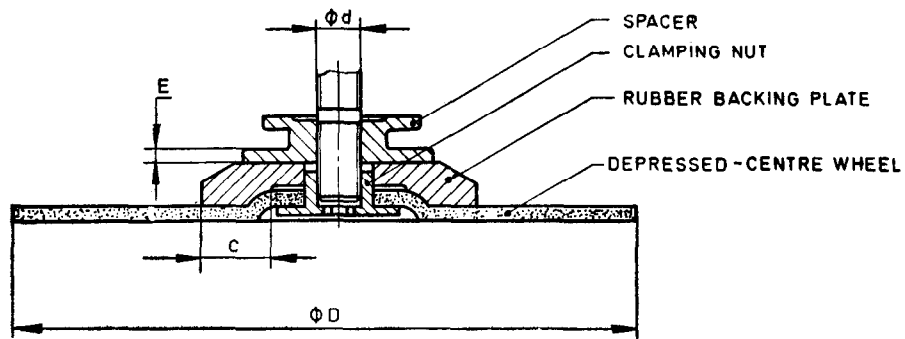
Adopted 3 July 1987

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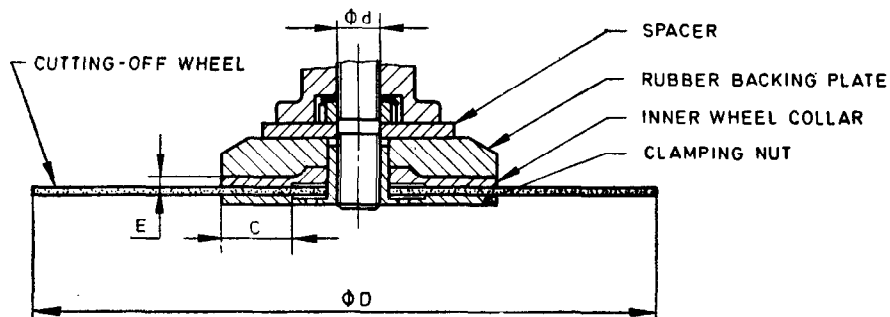
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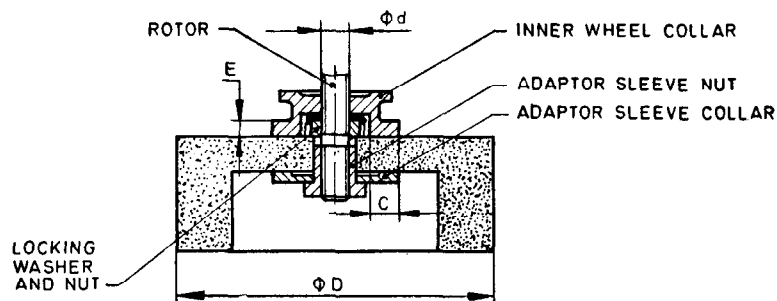
FOR STRAIGHT WHEELS



DEPRESSED-CENTRE WHEEL ASSEMBLY



CUTTING-OFF WHEEL ASSEMBLY



STRAIGHT-CUP WHEEL ASSEMBLY

FIG. 1 DIMENSIONS FOR GRINDING WHEELS, TYPE A AND TYPE B

6.3 Air Inlet Connection — Air inlet connection shall conform to IS : 554 - 1985 'Dimensions for pipe threads where pressure-tight joints are made on threads (*third revision*)'.

6.4 Air Control — The grinding machine shall be provided with manually operated 'ON-OFF' switch for switching on and off the air supply.

6.5 Speed Control — Grinding machines with nominal sizes of 50 and above shall be governed for controlling the speed of the grinding machine.

6.6 Lubrication — Arrangement shall be made to lubricate internal moving parts either with a built-in lubricator or by an external lubricator installed in the system.

6.7 Flange Plates — Both the flange plates used to grip the abrasive wheel of grinding machine shall be of the same diameter and shall not be less than $\frac{1}{3}$ of the diameter of the abrasive wheel. The bearing surface of the flange shall be perpendicular to the axis within maximum error of 0.13 mm measured on the extreme periphery of the bearing surface. For more details on flanges; refer to IS : 1991 (Part 5) - 1987 'Safety code for use, care and protection of abrasive wheels : Part 5 Flanges (*second revision*)'.

Material used for the flanges shall have minimum tensile strength of 400 N/mm².

TABLE 1 DIMENSIONAL REQUIREMENTS FOR PNEUMATIC GRINDING MACHINES

(Clause 4, Fig. 1)

All dimensions in millimetres.

Nominal Size	Wheel Capacity, <i>D</i> (Up to and Including)	Spindle Dia, <i>d</i>	Maximum Mass kg	Recommended Air Connection Size (As per IS : 554-1975)	Flange Dimensions		
					<i>C</i> , <i>Min</i>	<i>E</i> , <i>Min</i>	
						Type A	Type B
25	Suitable for mounted points		2.5	Rc $\frac{1}{4}$	—	—	—
40	40	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	—
50	50	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	—
63	63	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	—
80	80	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	—
100	100	13, (15.88), 16	6.0	Rc $\frac{1}{2}$	10	4	3
125	125	13, (15.88), 16	6.5	Rc $\frac{1}{2}$	10	7	3
150	150	13, (15.88), 16	7.0	Rc $\frac{1}{2}$	10	7	3
180	180	13, (15.88), 16	7.5	Rc $\frac{1}{2}$	12	7	3
200	200	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	16	9	4
230	230	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	16	9	4
250	250	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	19	9	4

Note 1 — Nominal size of the grinding machine is the maximum grinding wheel size utilized by it.

Note 2 — Spindle sizes given in parenthesis are non-preferred sizes.

IS : 7157-1987

6.8 Wheel Guard — Every grinding machine shall be provided with wheel guard, except those fitted with collets for holding mounted points.

The guard shall be properly secured with the machine. For other details on wheels safety guards; refer IS : 1991 (Part 4) - 1987 'Safety code for use, care and protection of abrasive wheels: Part 4 Safety guards (second revision)'.

6.8.1 Exposure — For plain grinding wheels, the maximum angular exposure of the periphery of abrasive wheel shall not exceed 180° and the top of the wheel shall be protected at all times.

For disc grinding wheels, the maximum angular exposure of the periphery of the wheels shall be 180° and shall be located so as to be between the operator and the wheel during use. For more details on exposure, refer IS : 1991 (Part 4) - 1987.

6.8.2 Dimensions for guards — Shall be as given in Table 2.

6.9 Instruction Manual — Instruction Manual shall be supplied with each grinding machine. For details of data to be given in the instruction manual, reference may be made to IS : 11609 - 1986 'Technical supply conditions for pneumatic tools'.

7. Tests

7.1 Measurement of Air Consumption — Air consumption shall be determined with either liquid displacement meter or any suitable flow measuring instrument. The flow measuring instrument shall be located within 3 metres from the grinding machine.

7.2 Measurement of Speed — For measurement of speed in revolution per minute (*rpm*), any contact or non-contact type speed measuring device shall be used, such as tachometer or stroboscope.

7.3 Measurement of Pressure — For measurement of air pressure, gauge of any suitable type shall be used. The pressure to be read shall fall between one fourth and three fourth of full scale reading. The pressure shall remain constant at 6.0 ± 0.5 bars during testing.

7.4 No Load Test — No load running shall be carried out for a period of minimum 2 minutes. Speed and air consumption shall be measured during no load test. There shall be a tolerance of ± 5 percent of declared values of the speed and air consumption shall be within +5 percent of the declared values.

7.5 Load Test — Grinding machines of nominal size 100 and above will be subjected to load test. The load test shall be carried out by coupling the grinder-spindle to prony brake or to any suitable attachment to cause resistance. The speed and air consumption shall be measured at the specified load condition.

Speed shall be within ± 5 percent of its declared values and the air consumption shall be within +5 percent of the declared values.

7.6 Operation Test — The grinding machine shall be tested for easy starting and stopping. The temperature rise on the surface of the machine shall not exceed 10°C above ambient, when tested, after running it for half an hour continuously on rated full load.

8. Marking — The grinding machines shall be marked at a suitable place so that in the course of normal use, the markings do not get damaged. The grinders shall be marked with manufacturer's name, initials or trade-mark, maximum working air pressure and maximum working speed.

Grinding machines may also be marked with serial number and the year of manufacture if desired by the purchaser.

8.1 Certification Marking — Details available with the Bureau of Indian Standards.

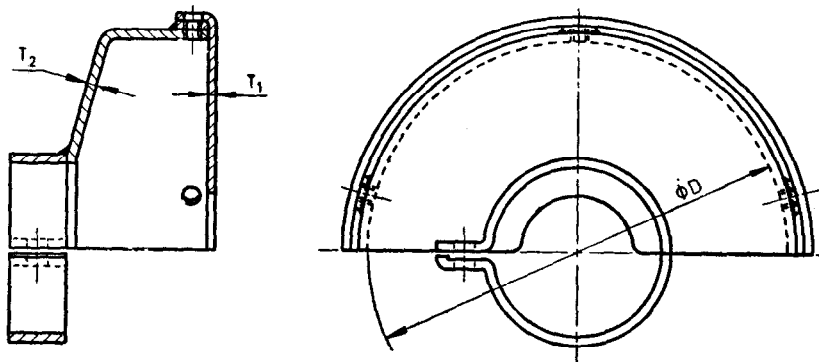
9. Packing and Packaging — Before packing, the inlet, exhaust and other openings of each grinding machine shall be adequately protected/covered against entry of dust and other harmful material. Each grinding machine shall be packed in such a way that no damage is done during transit. For packing refer IS : 11609 - 1986.

10. Declared Values — Manufacturers shall furnish the values of the following parameters at 6 ± 0.5 bars inlet air pressure, as their declared values, at the time of enquiry:

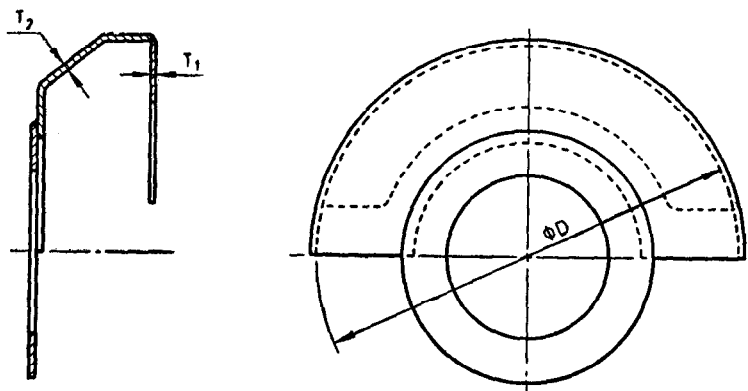
- a) Wheel capacity of the grinding machine for different types of grinding wheels with different bonds,
- b) No load speed,
- c) Air consumption on no load,
- d) Speed at the declared load condition for nominal sizes 100 and above, and
- e) Air consumption at the declared load condition for nominal sizes 100 and above.

TABLE 2 DIMENSIONS FOR GUARDS
(Clause 6.8.2)

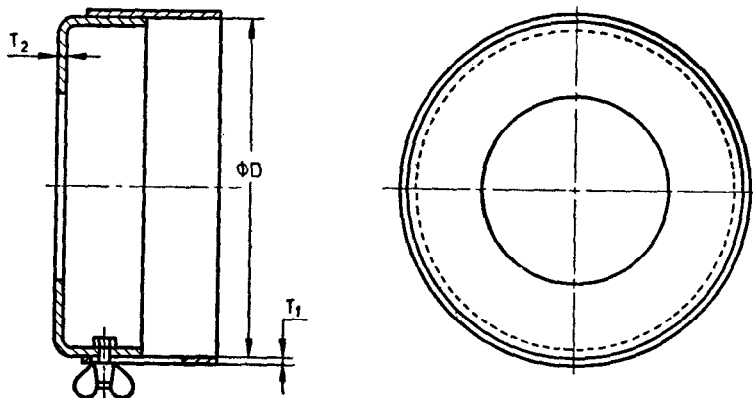
All dimensions in millimetres.



GUARD FOR STRAIGHT WHEELS, FRONT-ENCLOSED



GUARD FOR DEPRESSED-CENTRE WHEEL AND CUTTING-OFF WHEEL



GUARD FOR STRAIGHT AND TAPER-CUP WHEELS

Nominal Size of Grinding Machines	T_1 Min	T_2 Min	D
For wheel size up to 100	1.5	1.5	(Dia, of wheel + 10)
For wheel size 100 to 250	2	3	

Note — Figures shown above are only indicative and do not specify the design features.

EXPLANATORY NOTE

This specification, which was first issued in 1974, has been revised to bring it in line with the developments and experience gained by the industry.

While revising, the air consumption, load test and no load test values have been toleranced on its declared values by the manufacturers. Safe limits of the peripheral wheel speeds have also been included.

While preparing this standard, considerable assistance has been taken from the details supplied by the leading manufacturer's of the product in the revision of this standard.